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of Galvani gives sufficient indications of the electric current without the use of that instrument.

The general results obtained from these experiments are the following.

In the first place, the intensity and duration of the muscular current is independent of the nature of the gas in which the muscular pile is immersed. Secondly, it is altogether independent of the cerebro-spinal portion of the nervous system. Thirdly, the circumstances which exercise a marked influence on its intensity are the conditions of the respiratory and circulatory systems. Fourthly, those poisons which seem to act directly on the nervous system, such as hydrocyanic acid, morphia and strychnine, have no influence on the nervous current. Fifthly, sulphuretted hydrogen has a decided influence in diminishing the intensity of the muscular current. Sixthly, the intensity of this current in frogs varies according to the temperature in which the frogs have been kept for a certain time during life; a result which, of course, is not obtainable with animals which do not take the temperature of the surrounding medium. Lastly, the intensity of the muscular current in animals increases in proportion to the rank they occupy in the scale of beings; and on the other hand, its duration after death is exactly in an inverse ratio to its original intensity. The author concludes by stating his belief, that the property of the muscles immediately connected with their electric currents, is identical with that which was long ago denominated by Haller *irritability*, but which is at present more usually designated by the term *contractility*. He ascribes the development of this muscular electricity to the chemical actions which are attendant on the process of nutrition of the muscles, and result from the contact of arterial blood with the muscular fibre. He conceives that in the natural state of the muscle, the two electricities thus evolved neutralise each other at the same points at which they are generated; while in the muscular pile contrived by the author, a portion of this electricity is put into circulation in the same manner as happens in a pile composed of acid and alkali separated from one another by a simply conducting body.

June 19, 1845.

RICHARD OWEN, Esq., V.P., in the Chair.

"On the Connexion between the Winds of the St. Lawrence and the Movements of the Barometer." By William Kelly, M.D., Surgeon R.N., attached to the Naval Surveying Party on the River St. Lawrence. Communicated by Captain Beaufort, R.N., F.R.S.

The author adduces a great number of observations which are in opposition to the generally received opinion, that the mercury in the barometer has always a tendency to fall when the wind is strong. During a period of fifteen years passed in the Gulf and River St.

Lawrence, he found that the barometer as frequently rises as falls under the prevalence of a strong wind; and that the winds often blow with greater force with a rising than with a falling barometer. He gives a circumstantial account of the progress and course of various gales which fell under his observation during that period, and from which he infers the existence of a steady connexion between the prevailing winds of this region and the movements of the barometer, and enters into an inquiry into the mode in which that instrument is affected by them. The extensive valley of the St. Lawrence is bounded at its lower part, for a distance of nearly 500 miles, by ranges of hills, rising on each side to a considerable elevation. Within this space, the ordinary winds follow the course of the river; and in almost every instance when they approach from windward, the barometer rises with them; and when, on the other hand, the wind approaches from leeward, the barometer not only falls before the arrival of the wind, but continues to fall until it has subsided.

An appendix is subjoined containing extracts from the tabular register of the barometer and winds at various points in the valley of the River St. Lawrence, during the years 1834 and 1835, accompanied by remarks on different points deserving notice in particular cases.

"On the Elliptic Polarization of Light by reflexion from Metallic Surfaces." By the Rev. Baden Powell, M.A., F.R.S., Savilian Professor of Geometry in the University of Oxford.

In a former paper, published in the Philosophical Transactions for 1843, the author gave an account of the observations he had made on the phænomena of elliptic polarization by reflexion from certain metallic surfaces, but with reference only to one class of comparative results. He has since pursued the inquiry into other relations besides those at first contemplated, and the present paper is devoted to the details of these new observations, obtained by varying the inclination of the incident rays, and the position of the plane of analysation, and by employing different metals as the reflecting surfaces. By the application of the undulatory theory of light to the circumstances of the experiments and the resulting phænomena, the law of metallic retardation is made the subject of analytic investigation. A polariscope of peculiar construction, of which a description is given at the conclusion of the paper, was employed in the experiments: and tables are subjoined of the numerical results of the observations.

"On the Gas Voltaic Battery. Voltaic Action of Phosphorus, Sulphur, and Hydrocarbons." By William Robert Grove, Esq., M.A., F.R.S., V.P.R.I., Professor of Experimental Philosophy at the London Institution.

The author, referring to a paper of his published in the Philosophical Transactions for 1843, states, that in repeating and verifying some of the experiments therein contained, he was led to those which